MA3042: LINEAR ALGEBRA
Fall 2004

Instructor: Craig Rasmussen
Office: Spanagel 247A
Office hours: To be determined at first meeting of class.
Phone: x2763
E-mail: ras@nps.navy.mil
Course website: follow link from http://www.math.nps.navy.mil/∼ras
Text: *Linear Algebra with Applications*, 6th edition, Steven J. Leon, Prentice Hall 2001.

This is a first course in linear algebra for students who have already learned the fundamental concepts and operations of matrix algebra. The emphasis is on acquisition of tools that are useful in a variety of areas of mathematics, with special emphasis on techniques useful in optimization. To foster the greatest possible understanding of these tools, their theoretical underpinnings, and their limitations, the course is necessarily more abstract than an elementary course. Applications will be illuminated but, due to time constraints, cannot be emphasized to an extent beyond that necessary to motivate the study of the core material.

Three exams will be given. The first and second exams, in weeks four and eight, respectively, will be worth 100 points each. The final exam, worth 200 points, will be comprehensive. Quizzes will have a scaled cumulative value of 100 points. With the exceptions of week one, week eleven, and exam weeks, quizzes will be given weekly (or nearly so) and will cover the previous week's topics. Coverage will be as shown in the following table.

Week	**Sections**	**Topics**
1	3.1–3.3	Vector Spaces & Subspaces, Linear Independence
2	3.4, 3.5	Basis and Dimension, Change of Basis
3	3.6, 4.1–4.3	Row/Column Spaces, Linear Transformations, Similarity
4	5.1–5.2	Scalar Product in $\mathbf{R}^n$, Orthogonal Subspaces Exam I
5	5.3–5.5	Inner Product Spaces, Least Squares, Orthonormal Sets
6	5.6 6.1, 6.3	Gram-Schmidt Orthogonalization, QR-factorization Eigenvalues/Eigenvectors, Diagonalization
7	6.4, 6.5	Hermitian/Symmetric Matrices, Singular Value Decomposition
8	6.6, 6.7	Quadratic Forms, Positive Definite Matrices and Cholesky Factorization Exam II
9	7.1, 7.3	Floating-point Arithmetic, Pivoting Strategies
10	7.4, 7.5	Matrix Norms, Condition Numbers, Orthogonal Transformations
11		Review (and overflow, if necessary)
12		Final Exam

MA/Ra, September 23, 2004